Motion of the inverted-V structure during an isolated substorm

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The inverted-V is an energetic electron precipitation event, which can be seen as a V-shape structure in electron flux spectrograms, and causes intense auroral arcs. Previous studies have suggested that the inverted-V structure can move fast poleward or equatorward. However, we still do not understand what drives its motion. In this study we have investigated the detailed characteristics of an inverted-V structure moving poleward, which occurred during an isolated substorm, using simultaneous observations of auroras, precipitating electrons, and field-aligned currents. We analyzed aurora data (630-nm and 557.7-nm) from an all-sky imager at Longyearbyen, Svalbard, and precipitating electrons and magnetic field data from the DMSP spacecraft (F16, F17, F18, F19). One of the interesting characteristics of the poleward-moving inverted-V is the appearance of a downward field-aligned current equatorward of and adjacent to the inverted-V. We discuss how the region of the downward field-aligned current evolves in association with the motion and growth/decay of the inverted V structure, and possibility of a role of the downward field-aligned current for the latitudinal motion of the inverted V.

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